The Effect of Security, Speed, and Ease on Customer Loyalty to E-Wallets on the Marketplace Platform

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Abstract: This study examines the effects of security, transaction speed, and ease of use on customer loyalty in the context of e-wallet usage within Indonesian marketplace platforms. As digital payment systems continue to gain traction, understanding the factors that influence customer loyalty is crucial for e-wallet providers. The research is based on the Technology Acceptance Model (TAM) and ES-QUAL, using data from 119 respondents, primarily students aged 21–25. The measurement instruments used in the study were confirmed to be valid and reliable, with item-total correlation values exceeding the critical threshold and Cronbach's Alpha values above 0.743. The data met the assumptions for normality, with no issues of multicollinearity or autocorrelation, although heteroscedasticity was observed in the security variable. Using multiple linear regression analysis, the study found that all three variables—security, transaction speed, and ease of use—significantly affected customer loyalty. Ease of use had the highest impact ($\beta = 0.280$, $p = 0.001$), followed by security ($\beta = 0.284$, $p = 0.001$), and transaction speed ($\beta = 0.228$, $p = 0.007$). The regression model explained 33.7% of the variation in customer loyalty ($R^2 = 0.337$). These findings highlight the importance of creating user-friendly interfaces, ensuring fast and efficient transactions, and providing strong data protection in building customer loyalty. Recommendations for e-wallet providers and policymakers include enhancing service quality and promoting broader adoption of digital financial services.

Keywords: Customer Loyalty; Ease of Use; E-wallet; Security; Speed

1. INTRODUCTION

The development of digital wallets (e-wallets) within marketplace platforms in Indonesia has shown a significant upward trend, driven by the rapid advancement of financial technology and the increasing rate of digital adoption. E-wallets, which facilitate cashless transactions, have become the most preferred payment method among consumers, especially in e-commerce platforms such as Tokopedia, Shopee, and Bukalapak (Karim et al., 2020). According to a report by Bank Indonesia, the value of digital transactions in 2023 reached IDR 1,846 trillion—an increase of 22.43% compared to the previous year—highlighting the important role of e-wallets in the digital transformation of the financial sector (Seng et al., 2023). This figure highlights the crucial role of e-wallets in the ongoing digital transformation of the financial sector.

The integration of digital payment services such as GoPay, ShopeePay, OVO, Dana, and LinkAja into marketplace platforms not only enhances convenience for users but also accelerates the growth of the digital economy (Ulansari & Yudantara, 2021). A Katadata survey reported that 74% of users prefer digital wallets as their primary payment method, with 79% using them for online shopping. Furthermore, 61% of users rely on more than one e-wallet to meet diverse transactional needs (Dhanesworo, 2022). These trends underscore the practical value of e-wallets in simplifying the consumer shopping experience in the digital age.

However, despite the rapid growth of digital payment adoption, e-wallet platforms continue to face ongoing challenges related to security, transaction speed, and ease of use. Users demand systems that are secure from cybercrime threats and offer uninterrupted, rapid transaction processing (Nowroozi et al., 2023). Research findings have revealed recurring security vulnerabilities, data breaches, and technical problems such as system lag and application errors (Kee, 2022; Narendrar et al., 2023). These issues significantly impact user satisfaction and pose a risk to customer loyalty, especially in a highly competitive digital payment environment (Narendrar et al., 2023). Additionally, usability issues, such as the lack of interoperability between platforms, also affect the user experience (Razali et al., 2020).

Theoretically, this study adopts the Technology Acceptance Model (TAM) developed by Davis (1989), which emphasizes two primary factors: perceived usefulness and perceived ease of use. Effective security measures enhance perceived usefulness by increasing users' confidence and trust in digital payment platforms (kee, 2022). Meanwhile, responsive interfaces and quick system navigation contribute to perceived ease of use (Shaikh & Amin, 2024).

This study also employs the ES-QUAL model developed by Parasuraman et al. (2005) to assess digital service quality across four dimensions: efficiency, system availability, fulfillment, and privacy. In the context of e-wallet usage, security relates to privacy, transaction speed aligns with efficiency and system availability, and ease of use corresponds to the fulfillment dimension (Saraswat & Chouhan, 2022).

Although various studies have discussed user satisfaction and trust in digital financial services, few have specifically examined the combined influence of security, speed, and usability on customer loyalty, particularly in the context of e-wallets integrated with digital marketplaces in Indonesia. Therefore, this research aims to fill this gap by analyzing how these factors contribute to user loyalty, supported by the theoretical frameworks of TAM and ES-QUAL.

2. LITERATURE REVIEW

Theoretical Foundation

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), developed by Davis (1989), is a well-established theory used to explain individual behavior toward the adoption of technology. This model posits that perceived usefulness and perceived ease of use are two key factors influencing an individual's intention to use a technology system. These factors affect the user's

attitude toward use, which in turn shapes their intention to use and ultimately their actual system usage (Davis, 1989; Jogiyanto, 2007).

In the context of e-wallets, perceived usefulness refers to the extent to which users believe that the system can help them perform financial transactions quickly, securely, and efficiently. Security features such as two-factor authentication and data encryption significantly enhance user trust, making the system more valuable and reliable in daily use (Wahyuningsih & Nirawati, 2022).

Perceived ease of use, on the other hand, is defined as the degree to which users believe that using the system will be free of effort. This includes having a user-friendly interface, intuitive navigation, and accessible features such as transaction history, fund transfers, and payment verification. According to Shaikh and Amin (2024), perceived ease of use is a strong predictor of users' willingness to adopt and continue using digital financial platforms.

TAM also helps explain how early perceptions of security and speed shape users' expectations and behaviors. Riantini et al.,(2018); Karim et al. (2020) found that usability and system efficiency significantly influence technology adoption among digital-native consumers. Therefore, TAM is highly relevant for analyzing how perceived security, transaction speed, and usability affect customer loyalty in digital financial services. The TAM model has been widely applied across different technological domains, including mobile banking, QR-code payments, and cloud-based financial applications. One of its key strengths is its ability to explain user behavior based on subjective perceptions rather than demographic characteristics Ling et al. (2023).

Electronic Service Quality (ES-QUAL)

Electronic Service Quality (ES-QUAL), introduced by Parasuraman, Zeithaml, and Malhotra (2005), is a measurement model developed to assess the quality of services delivered via online platforms. ES-QUAL includes four core dimensions: efficiency, system availability, fulfillment, and privacy.

Efficiency reflects how easily and quickly users can access and utilize the service. In e-wallets, efficiency is defined by fast loading times, system responsiveness, and smooth transaction execution (Zia et al., 2022). System availability describes the reliability of the system in delivering consistent and uninterrupted service. Frequent system errors or unannounced maintenance can significantly erode user trust (Ramadania, 2021). Fulfillment refers to the system's ability to deliver on its promises, such as completing transactions successfully and providing accurate information (Zia et al., 2022). This is closely tied to ease of use. Privacy relates to the protection of personal and financial data. In the digital finance

ecosystem, privacy assurance plays a critical role in building long-term user trust, especially in light of increasing data breach incidents (Indama, 2022; ; Rahi et al., 2023).

Wahyuningsih and Nirawati (2022) confirmed that service quality, as measured by the ES-QUAL framework, has a direct impact on customer loyalty toward e-wallet platforms. High performance in these four dimensions strengthens user satisfaction, which in turn fosters trust and loyalty in a competitive digital environment. The use of ES-QUAL in this study allows for a holistic assessment of service quality—not only from a technical perspective but also from the user's psychological and behavioral standpoints. When e-wallet platforms perform well across efficiency, system availability, fulfillment, and privacy, users are more likely to remain loyal despite market saturation and technological changes.

Hypothesis Development

The Influence of Security on Customer Loyalty

Security is a fundamental factor in e-wallet usage as it directly influences users' trust in safeguarding their personal and financial data. In the digital environment, users expect encryption, two-factor authentication, and fraud detection systems to be reliably implemented (Hidayah et al., 2021). Prior studies confirm that strong security features minimize perceived risks and enhance user comfort during transactions (Marhaendra & Mahyuzar, 2023). According to the ES-QUAL model, security falls under the privacy dimension, which significantly contributes to building customer loyalty (Parasuraman et al., 2005). When users feel protected, their commitment to continue using a specific e-wallet increases.

Further, research by Diva and Anshori (2024) emphasized that trust established through secure systems strongly influences customer retention. Wahyuningsih and Nirawati (2022) also found that users tend to remain loyal to e-wallet platforms offering optimal protection from cyber threats. Nevertheless, a report by Mutia (2022) revealed that digital wallets remain among the most vulnerable financial products to data breaches, urging providers to continuously enhance their cybersecurity measures. Hence, the following hypothesis is proposed:

H1: Security has a positive and significant effect on customer loyalty in the use of e-wallets on marketplace platforms.

The Influence of Transaction Speed on Customer Loyalty

Transaction speed is one of the key competitive advantages of e-wallets over traditional payment systems. In the ES-QUAL model, speed is part of the efficiency and system availability dimensions, which directly impact user satisfaction and loyalty (Tiwari et al., 2023). Bagra et al. (2023) argue that fast, seamless transactions enhance customer experience

and reduce friction, making users more inclined to stay loyal. This is consistent with TAM, which suggests that system performance—including speed—affects perceived usefulness and ease of use (Davis et al., 1989). According to Dhanesworo (2022), users increasingly prefer e-wallets for their ability to handle transactions efficiently during e-commerce interactions.

Seng et al., (2023) highlighted that app failures or delays during transactions are among the top reasons for declining user satisfaction. Wardani and Susanti (2024) confirmed that a fast transaction system significantly affects loyalty, particularly among Gen Z users who demand instant digital experiences. When users consistently enjoy smooth transactions, their tendency to switch to competitors decreases. Therefore, speed not only improves functionality but also reinforces long-term user commitment. Based on this, the second hypothesis is stated as follows:

H2: Transaction speed has a positive and significant effect on customer loyalty in the use of e-wallets on marketplace platforms.

The Influence of Ease of Use on Customer Loyalty

Ease of use refers to how effortlessly users can navigate and utilize an e-wallet application. In the Technology Acceptance Model (TAM), perceived ease of use is one of the primary predictors of user adoption and loyalty (Davis et al., 1989; Kee, 2022). Ismi and Abdilla (2023) emphasized that a user-friendly interface with intuitive navigation increases convenience and satisfaction. Additionally, Astuti and Mahmud (2023) observed that ease of interaction directly enhances loyalty by lowering cognitive effort and increasing repeat usage. Applications that simplify tasks—such as registration, top-ups, and payments—tend to retain users longer.

Previous studies also confirmed that ease of use contributes significantly to customer loyalty by fostering positive user experiences (Susanti, 2023; Dirnaeni et al., 2021). In the Indonesian context, apps like DANA and ShopeePay that offer seamless navigation and efficient features enjoy higher customer retention rates (Ningsih, 2023). Shaikh and Amin (2024) further noted that ease of use shapes users' emotional attachment to digital services, ultimately influencing their long-term loyalty. Therefore, the final hypothesis is:

H3: Ease of use has a positive and significant effect on customer loyalty in the use of e-wallets on marketplace platforms.
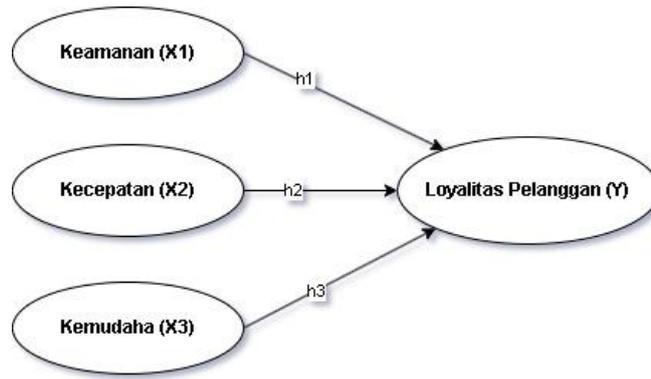
Figure 1. Conceptual Framework.

3. METHOD

Research Approach

This research uses a quantitative approach because all data collected are in numerical form and analyzed using statistical techniques to test the hypotheses that have been previously formulated. This approach allows researchers to objectively measure the influence between variables, in this case, security, speed, and ease of use in e-wallet usage on customer loyalty in the marketplace. According to Sugiyono (2020), the quantitative approach is deductive, objective, and systematic and relies on scientific logic tested with structured statistical procedures. This approach is also considered appropriate because the focus of the research relates to digital user behavior, which tends to be measurable through standardized variables (Wahyuningsih & Nirawati, 2022). In addition, the quantitative approach has been widely used in various previous studies that examined user loyalty toward digital financial services (Kumala et al., 2020), thereby further strengthening the relevance of this method in the context of this study.

Population and Sample

The population in this study consists of active e-wallet users who have made transactions through marketplace platforms, especially in the Pontianak City area. This population characteristic was chosen because it represents a group of digital users who are quite active in the local e-commerce ecosystem. To obtain representative and relevant data, purposive sampling was used, which is a sampling technique that considers specific criteria relevant to the research objectives. The criteria set are that respondents must be over 17 years old, have used one or more e-wallets, and have made transactions through marketplaces such as Shopee, Tokopedia, or Bukalapak. According to Ferdinand (2014), the minimum sample size can be calculated by multiplying the number of variables in the study by 25. In this study, there are

four variables, namely security, speed, ease of use, and customer loyalty, so the minimum number of samples is 100 respondents (4 × 25). However, to improve the reliability of the data and anticipate invalid responses, the number of respondents determined is 100 people.

Research Instrument

This study focuses on four primary constructs, which are defined as follows: Security (X1), Speed (X2), and Ease of Use (X3) as independent variables, and Customer Loyalty (Y) as the dependent variable. These constructs reflect key components of the Technology Acceptance Model (TAM) and ES-QUAL framework, emphasizing how user perceptions of usability, efficiency, and protection contribute to behavioral loyalty in digital financial services. Together, these variables provide a comprehensive perspective on user acceptance and satisfaction with e-wallet platforms, particularly in the context of marketplace usage in Indonesia. Table 1 presents the operational definitions and measurement indicators applied in this research.

Table 1. Indicators.

No	Variabel Name	Definition	Indicators
1	Security	Security refers to the belief that a technology system can prevent fraud in an information-based system, where the data does not involve physical handling. (Rahmawati et al., 2020)	X1.1 I feel the risk of using this e-wallet is minimal.
			X1.2 I believe my financial information is protected when using the e-wallet.
			X1.3 I am confident that the security of this e-wallet supports my comfort as a user.
2	Speed	Speed is the e-wallet's ability to process transactions quickly and responsively, which contributes to user satisfaction. (Mustaqor & Winanto, 2022)	X2.1 I can make e-wallet transactions anytime and anywhere.
			X2.2 The transaction process using the e-wallet is fast.
			x2.3 The e-wallet app responds quickly during use.
			X2.4 I rarely experience delays in completing transactions.
			X2.5 I can complete payments with the e-wallet in a short time.
3	Ease of Use	Ease of use refers to the extent to which users believe that using the system requires little effort and is easy to understand. (Astusi & Mahmud, 2023; Susanti & Parera, 2021)	X3.1 I can easily understand how this e-wallet works.
			X3.2 This e-wallet application is easy to use without assistance.
			X3.3 This e-wallet is flexible and usable in various situations.
			X3.4 This e-wallet makes it easier for me to complete transactions on the marketplace.

Customer Loyalty	Customer loyalty is the user's commitment to continue using and recommending the e-wallet, even when facing competing offers. (Kotler & Keller, 2016, in Desti et al., 2021)	Y1. I will continue using this e-wallet for future transactions. Y2. I will recommend this e-wallet to others. Y3. I prefer this e-wallet over other options.

Data Collection Technique

Data collection was conducted using an online survey method, in which the questionnaire was distributed via the Google Form platform. The survey was shared through social media such as WhatsApp, Telegram, and Instagram, which are common communication tools among e-wallet users in Indonesia. This method was chosen because it allows researchers to reach respondents in a short time, without geographical barriers, and at a lower operational cost. According to Sugiyono (2020), surveys are an effective way to collect primary data directly from respondents through systematically prepared questions. Furthermore, this method is suitable given the characteristics of respondents who are active users of digital financial services (Wahyuningsih & Nirawati, 2022).

Data Analysis Technique

Before the data were analyzed, validity and reliability tests were conducted to ensure that the instruments used were able to measure the intended constructs consistently and accurately. Validity was tested using the Pearson correlation technique, while reliability was tested using Cronbach's Alpha value, with a minimum threshold of 0.6. After ensuring that the instrument met the valid and reliable requirements, classical assumption tests were conducted, including tests for normality, multicollinearity, and heteroscedasticity. The main analysis technique used in this study is multiple linear regression. This method is used because it can test the influence simultaneously and partially between independent variables and the dependent variable. According to Ghozali (2021), multiple linear regression is an appropriate technique to analyze the relationship between two or more independent variables and one dependent variable, especially in the context of social research and consumer behavior. This technique is also used in various studies related to customer loyalty in digital services, including by Kumala et al., (2020) who used a similar approach in examining e-wallet applications based on the digital behavior of Indonesian society.

4. RESULT AND DISCUSSION

Demographic Characteristics

A total of 119 respondents participated in this study. Based on gender distribution, the sample consisted of 64 females (53.8%) and 55 males (46.2%), indicating a relatively balanced gender composition with a slight female majority. In terms of age, most participants were between 21–25 years old (42.9%, n = 51), followed by 26–30 years old (33.6%, n = 40), and 18–20 years old (22.7%, n = 27), while only 1 respondent (0.8%) was over 30 years old. This suggests that the sample primarily represents a young and digitally active demographic. Regarding employment status, the majority of respondents were students (50.4%, n = 60), followed by private sector employees (34.5%, n = 41), with smaller portions identifying as entrepreneurs (6.7%, n = 8), civil servants (4.2%, n = 5), and others (4.2%, n = 5). This demographic profile reflects a population that is either still in education or in the early stages of their careers, aligning well with the study's objective to explore digital payment behavior among young adults.

Table 2. Demographic Characteristics.

Gender	n	%
Female	64	53,8
Male	55	46,2
Total	119	100
Age	n	
18–20 years old	27	22,7
21–25 years old	51	42,9
26–30 years old	40	33,6
31+ years old	1	0,8
Total	119	100
Employment Status		
Student	60	50,4
Private Sector Employee	41	34,5
Entrepreneur	8	6,7
Civil Servant	5	4,2
Other*	5	4,2
Total	119	100

Validity and Reability

To ensure the accuracy of the measurement instruments, validity and reliability tests were carried out using responses from 119 participants. The results of the validity test showed that all items had Corrected Item-Total Correlation values exceeding the r-table threshold of 0.180 (df = 117, α = 0.05), with values ranging from 0.803 to 0.843 for Security (X1), 0.810 to 0.839

for Speed (X2), 0.818 to 0.831 for Ease of Use (X3), and 0.802 to 0.823 for Customer Loyalty (Y). These results confirm that each item is sufficiently correlated with its respective construct and can be considered valid.

The reliability test further demonstrated that the instruments used in this study possess high internal consistency. The Cronbach's Alpha values for each variable were 0.732 for Security, 0.882 for Speed, 0.841 for Ease of Use, and 0.739 for Customer Loyalty all of which exceed the minimum acceptable threshold of 0.60 as suggested by Sugiyono (2020). These findings confirm that the measurement items are both valid and reliable for assessing the constructs in question.

Table 3. Validity and Reability.

Variabel		Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Keamanan	X1.1	0,817	0,732
	X1.2	0,803	
	X1.3	0,803	
Kecepatan	X2.1	0,839	0,882
	X2.2	0,843	
	X2.3	0,810	
	X2.4	0,811	
	X2.5	0,832	
Kemudahan	X3.1	0,826	0,841
	X3.2	0,818	
	X3.3	0,821	
	X3.4	0,831	
Loyalitas pelanggan	Y1	0,811	0,739
	Y2	0,823	
	Y3	0,802	

Source: Data Processing, 2025.

Normality Test

A normality test was conducted prior to regression analysis to confirm that the residuals followed a normal distribution, a key assumption for parametric statistical procedures. The Kolmogorov-Smirnov test yielded an Asymp. Sig. (2-tailed) value of 0.200, which is greater than the 0.05 threshold. This indicates that the residuals are normally distributed. With a sample size of 119, this result confirms that the assumption of normality is satisfied, allowing the regression analysis to proceed reliably.

Table 4. Normality Test.

Unstandardized Residual		
N		119
Normal Parameters[a,b]	Mean	0,0000000
	Std. Deviation	1,82031604
Most Extreme Differences	Absolute	0,059
	Positive	0,046
	Negative	-0,059
Test Statistic		0,059
Asymp. Sig. (2-tailed)[c]		0,200[c,d]

Source: Data Processing, 2025.

Multicollinearity Test

The multicollinearity test was conducted to identify any strong linear relationships among the independent variables that could potentially affect the stability and interpretability of the regression coefficients. The analysis revealed that the Variance Inflation Factor (VIF) values for each independent variable X1 (Security) = 1.093, X2 (Speed) = 1.185, and X3 (Ease of Use) = 1.166 are all well below the commonly accepted threshold of 10. Similarly, the tolerance values—0.915 for X1, 0.844 for X2, and 0.858 for X3 are above the minimum recommended value of 0.1 (Sugiyono, 2020). These results indicate that multicollinearity is not present in the model, confirming that the estimated regression coefficients are stable and the independent variables are sufficiently distinct for further analysis.

Table 5. Multicollinearity Test.

Model		Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	VIF
1	(Constant)		3,882	0,000		
	Total X1	0,284	3,538	0,001	0,915	1,093
	Total X2	0,228	2,728	0,007	0,844	1,185
	Total X3	0,280	3,386	0,001	0,858	1,166

Source: Data Processing, 2025.

Autocorrelation Test

The autocorrelation test was conducted to examine whether serial correlation existed among the residuals of the regression model. Based on the output, the Durbin-Watson value was 1.844, which falls comfortably within the acceptable range of 1.5 to 2.5 (Turner, 2020; Sugiyono, 2020). This indicates that there is no evidence of autocorrelation, and thus, the

residuals are independent across observations. With this assumption satisfied, the regression results can be interpreted reliably without concerns about error correlation.

Table 6. Autocorrelation Test.

Model	Std. Error of the Estimate	Durbin-Watson
1	1,844	1,844

Source: Data Processing, 2025.

Heteroscedasticity Test

The heteroscedasticity test was conducted to evaluate whether the variance of residuals remained consistent across different values of the independent variables. This test is essential for validating one of the classical assumptions of linear regression. The Glejser method was applied with a 5% significance threshold ($\alpha = 0.05$), following the guideline by Sugiyono (2020). Based on the regression output, the significance value for Total X1 (Security) is 0.000, which is below the 0.05 threshold, indicating the presence of heteroscedasticity for this variable. In contrast, the significance values for Total X2 (Speed) at 0.099 and Total X3 (Ease of Use) at 0.332 are above 0.05, suggesting no heteroscedasticity for these variables. Therefore, the model exhibits partial heteroscedasticity, specifically related to the Security variable. This condition should be taken into consideration when interpreting the regression coefficients, as it may affect the consistency of standard error estimates.

Table 7. Heteroscedasticity Test.

Model		Standardized Coefficients Beta	t	Sig.
1	(Constant)		7,100	0,000
	Total X1	-0,339	-3,872	0,000
	Total X2	-0,152	-1,664	0,099
	Total X3	-0,088	-0,088	0,332

a. Dependent Variable: abs_res

Source: Data Processing, 2025.

F Test

The F-test was conducted to evaluate the overall significance of the regression model and to determine whether the combination of independent variables Security (X1), Speed (X2), and Ease of Use (X3) significantly influences Customer Loyalty (Y). Based on the ANOVA table, the model yielded an F-statistic of 18.361 with a significance value of 0.000, which is well below the 0.05 threshold (Sugiyono, 2020). This result confirms that the three independent variables, when taken together, have a statistically significant impact on the dependent variable.

Therefore, the regression model is considered valid for explaining variations in customer loyalty within the context of e-wallet usage on marketplace platforms.

Table 8. F Test.

ANOVAᵃ

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	187,287	3	62,429	18,361	.000ᵇ
	Residual	390,999	115	3,400		
	Total	578,286	118			

a. Dependent Variable: Total Y

b. Predictors: (Constant), Total X1, Total X3, Total X2

Source: Data Processing, 2025.

T Test

The t-test was conducted to examine the individual effect and statistical significance of each independent variable Security (X1), Speed (X2), and Ease of Use (X3) on Customer Loyalty (Y). Using a 5% significance level as the benchmark ($\alpha = 0.05$; Sugiyono, 2020), the results demonstrate that all three variables have a statistically significant positive influence on customer loyalty. Security (X1) produced a significance value of 0.001 with a standardized coefficient (β) of 0.280, indicating a moderately strong effect. Similarly, Speed (X2) was significant at 0.001 with the highest beta coefficient of 0.284, suggesting it is the most influential factor in the model. Ease of Use (X3) also showed a significant effect, with a Sig. value of 0.007 and a β of 0.228. These results confirm that each independent variable individually contributes to enhancing customer loyalty in the context of e-wallet usage on marketplace platforms.

Table 9. T Test.

Coefficientsᵃ

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4,253	1,096		3,882	0,000
	Total X2	0,240	0,068	0,284	3,538	0,001
	Total X3	0,110	0,040	0,228	2,728	0,007
	Total X1	0,181	0,053	0,280	3,386	0,001

Source: Data Processing, 2025.

R² Test

The R^2 test was conducted to assess the proportion of variance in the dependent variable that can be explained collectively by the independent variables. The results show an R^2 value of 0.324, indicating that 32.4% of the variation in Customer Loyalty (Y) can be attributed to

Security (X1), Speed (X2), and Ease of Use (X3). Furthermore, the Adjusted R² value of 0.306 suggests that the model retains an acceptable level of explanatory power even after adjusting for the number of predictors included (Sugiyono, 2020). These findings imply that while the regression model offers a meaningful explanation of the outcome variable, additional external or unmeasured factors may also contribute to customer loyalty and warrant further investigation.

Table 10. R^2 Test.

Model Summary^b

Model	R Square	Adjusted R Square
1	0,324	0,306

Source: Data Processing, 2025.

To examine the direct relationships proposed in the research framework, this study employed a multiple regression analysis. The acceptance of each hypothesis was determined based on the significance value (p-value), with a threshold of $p < 0.05$ (Sugiyono, 2020). Additionally, the observed t-values were compared to the critical value of approximately 1.979 (df = 118, $\alpha = 0.05$, two-tailed). The regression results confirmed that all three independent variables—Security (X1), Speed (X2), and Ease of Use (X3)—had significant effects on Customer Loyalty (Y), as indicated by p-values below 0.05 and t-values exceeding the critical threshold. Therefore, all the proposed hypotheses in this study are supported.

Standardized beta coefficients were used to assess the strength and direction of the relationships. Security (X1) had a significant positive influence on customer loyalty, with a beta coefficient of 0.284 (t = 3.538, p = 0.001). Speed (X2) also showed a positive and significant effect, with a beta value of 0.228 (t = 2.728, p = 0.007). Ease of Use (X3) contributed positively to customer loyalty as well, with a beta coefficient of 0.280 (t = 3.386, p = 0.001). These findings reinforce the importance of all three constructs as drivers of customer loyalty in the context of e-wallet usage on marketplace platforms.

Although this study did not explore mediating effects, the substantial beta values suggest future research may benefit from examining potential mediators such as trust, satisfaction, or perceived value. In conclusion, the findings support the theoretical assumptions of the Technology Acceptance Model (TAM) and ES-QUAL, demonstrating that improving Security, Speed, and Ease of Use can significantly enhance consumer loyalty in the digital payment environment.

Table 11. Hypothesis Test.

#	Relationship	Hypothesis	Stabdardized Beta	t	Sig.	Decision
1	Total X1 > Total Y	h1	0,284	3,538	0,001	Supported
2	Total X2 > Total Y	h2	0,228	2,728	0,007	Supported
3	Total X3 > Total Y	h3	0,280	3,386	0,001	Supported
Mediation effect						

Source: Data Processing, 2025.

Discussion

This study investigates the influence of security, speed, and ease of use on customer loyalty in the context of e-wallets on marketplace platforms, using the Technology Acceptance Model (TAM) and ES-QUAL as the theoretical framework. The validity test confirmed that all indicator items for the variables—security (X1), speed (X2), ease of use (X3), and customer loyalty (Y)—were valid, with corrected item-total correlation values exceeding the r-table threshold (0.180). Reliability tests showed Cronbach's Alpha coefficients above 0.743 for all variables, indicating that the measurement instruments used in this study are internally consistent and reliable. The Kolmogorov–Smirnov test for residual normality yielded a Sig. value of 0.200, suggesting that the residuals are normally distributed and that the assumption of normality is met. Multicollinearity was not detected, with all VIF values ranging between 1.093 and 1.185 and tolerance values above 0.844, while the Durbin-Watson statistic of 1.844 indicated no presence of autocorrelation. However, the Glejser test revealed signs of heteroscedasticity for the security variable, which should be considered when interpreting the regression results.

The multiple linear regression analysis confirmed that security, speed, and ease of use significantly influence customer loyalty (Sig. = 0.000). The coefficient of determination (R^2 = 0.324) indicates that 32.4% of the variation in customer loyalty is explained by the independent variables, while the remainder is influenced by other factors outside the model. Individually, all variables demonstrated significant effects, with security having the strongest influence (β = 0.284, Sig. = 0.001), followed by ease of use (β = 0.280, Sig. = 0.001), and speed (β = 0.228, Sig. = 0.007). These findings are consistent with TAM, which posits that perceived ease of use contributes to the user's intention to continue using a technology. The results also support the application of ES-QUAL in digital service environments, suggesting that service quality dimensions such as efficiency, system availability, and privacy directly impact customer retention. Therefore, the combination of usability and service quality plays a critical role in fostering e-wallet loyalty.

From a managerial perspective, this study highlights the importance of prioritizing platform usability, transaction speed, and user data protection. These factors are particularly relevant to the majority demographic in this study—users aged 21–25 years (42.9%), with a large proportion being students (50.4%)—who are typically more responsive to intuitive digital interfaces and real-time transaction processing. While speed has a slightly smaller effect, it remains essential to ensure seamless transaction experiences. The results underscore the applicability of TAM and ES-QUAL in explaining user loyalty toward financial technologies in emerging digital markets. They also suggest that psychological perceptions, such as ease and reliability, can significantly influence behavior beyond technical functionality. To enhance customer loyalty, service providers must address both technological usability and perceived service quality through thoughtful design, transparent communication, and customer-centric improvements.

5. CONCLUSION

This study provides empirical insights into the factors that influence customer loyalty toward the use of e-wallets on marketplace platforms in Indonesia. Based on the Technology Acceptance Model (TAM) and the ES-QUAL framework, the findings demonstrate that security, speed, and ease of use significantly affect customer loyalty. Among these variables, security emerged as the most influential factor, followed by ease of use and speed. This underscores the importance of building user trust through secure systems, while also maintaining intuitive interfaces and rapid transaction processing. The model explains 32.4% of the variance in customer loyalty, reflecting moderate explanatory power and indicating that additional factors may also contribute and warrant further research.

Although the heteroscedasticity test identified variability in the security variable, no issues of multicollinearity or autocorrelation were detected, and the normality assumption was fulfilled with a significance value of 0.200. These results affirm the robustness and reliability of the regression model. Demographically, most respondents were students aged 21–25 years—a digitally literate segment likely to be critical of platform functionality. This finding highlights the need for e-wallet services to continuously improve aspects of usability, speed, and especially security to meet the expectations of this user group and reinforce customer loyalty in a competitive market.

In practical terms, this research offers valuable implications for developers, marketers, and policymakers aiming to strengthen the adoption of e-wallets in Indonesia. Service providers should prioritize not only technical performance but also user communication and

digital literacy to increase perceived value. Reinforcing security features, enhancing system responsiveness, and simplifying platform navigation are essential measures to retain users. Policymakers can draw on these findings to design regulations and outreach initiatives that foster digital financial inclusion by promoting user trust and operational reliability. As digital transactions become an integral part of daily life, cultivating customer loyalty through perceived safety, efficiency, and simplicity will be critical for long-term success and sustainable growth in the digital economy.

LIMITATIONS AND FUTURE RESEARCH

One notable limitation of this study is the cross-sectional design, which restricts the ability to determine causal relationships between security, speed, ease of use, and customer loyalty. Although significant associations were found, future research using longitudinal data would be beneficial to observe how these relationships evolve over time. Additionally, the study relied solely on self-reported survey data, which may be subject to social desirability or recall bias. The demographic concentration of respondents primarily students aged 21–25 also limits the generalizability of the findings to other age groups or occupational backgrounds. Expanding future samples to include older adults or individuals with varied professional experiences could improve external validity. Moreover, this study focused only on three independent variables; incorporating other factors such as trust, perceived risk, or satisfaction may provide a more comprehensive view of what drives loyalty in e-wallet users. Lastly, cultural and regional differences were not explored, suggesting that future studies could conduct comparative analyses across different geographic areas to strengthen contextual insights.

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